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GenCore version 5.1.6

OM protein - protein search, using sw model

Run on: June 18, 2003, 03:16:37 ; Search time 42.4159 Seconds
(without alignments)
1215.770 Million cell updates/sec

Title: US-09-807-933B-9
Perfect score: 2106
Sequence: 1 MKFTVAITSIAVALALSSSA.....TFKEVTCPAELTTRSGCERK 387

Scoring table: BLOSUM62
Gapop 10.0 , Gapext 0.5

Searched: 908470 seqs, 133250620 residues

Total number of hits satisfying chosen parameters: 908470

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries

Database : A_Geneseq_101002:*
1: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA1980.DAT:*
2: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA1981.DAT:*
3: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA1982.DAT:*
4: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA1983.DAT:*
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17: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA1996.DAT:*
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19: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA1998.DAT:*
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21: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA2000.DAT:*
22: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA2001.DAT:*
23: /SIDS2/gcgdata/geneseq/geneseqp-embl/AA2002.DAT:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	% Query Match	Length	DB	ID	Description
1	2106	100.0	387	21	AAB09825	Endoglucanase prot
2	2106	100.0	387	23	AAO15056	Rhizopus arrhizus
3	2106	100.0	387	23	ABB08064	M. circinelloides
4	1791.5	85.1	338	21	AAB09824	Endoglucanase prot
5	1791.5	85.1	338	23	AAO15055	Rhizopus arrhizus
6	1791.5	85.1	338	23	ABB08063	M. circinelloides
7	1363.5	64.7	366	21	AAB09822	Endoglucanase prot
8	1363.5	64.7	366	23	AAO15053	Rhizopus arrhizus
9	1363.5	64.7	366	23	ABB08061	R. oryzae CP96001
10	1222.5	58.0	338	21	AAB09821	Endoglucanase prot
11	1222.5	58.0	338	23	AAO15052	Rhizopus arrhizus
12	1222.5	58.0	338	23	ABB08060	R. oryzae CP96001
13	1195.5	56.8	360	21	AAB09823	Endoglucanase prot
14	1195.5	56.8	360	23	AAO15054	Rhizopus arrhizus
15	1195.5	56.8	360	23	ABB08062	R. oryzae CP96001
16	1170.5	55.6	346	21	AAB09826	Endoglucanase prot
17	1170.5	55.6	346	23	AAO15057	Phycomyces nitens
18	1170.5	55.6	346	23	ABB08065	P. nitens CP99002
19	966.5	45.9	245	23	AAO15063	Endoglucanase-rela
20	946	44.9	228	23	AAO15062	Endoglucanase-rela
21	769.5	36.5	299	17	AAW04928	Cellulytic enzyme
22	769.5	36.5	299	19	AAW63624	Monocomponent endo
23	768.5	36.5	306	19	AAW44270	Hybrid DNA protein
24	767.5	36.4	225	21	AAY84798	Amino acid sequenc
25	767.5	36.4	225	22	ABB05057	Chrysosporium C1 s
26	762.5	36.2	200	19	AAW53979	Thielavia terrestr
27	761.5	36.2	225	17	AAW04925	Cellulytic enzyme
28	761.5	36.2	297	17	AAW04933	Chimeric endogluca
29	761.5	36.2	308	17	AAW04934	Chimeric endogluca
30	760.5	36.1	200	19	AAW53967	Sordaria fimicola
31	754.5	35.8	200	19	AAW53968	Thielavia terrestr
32	753.5	35.8	204	19	AAW53970	Myceliophthora the
33	740	35.1	223	23	AAO15070	Humicola insolens
34	740	35.1	223	23	AAG80602	Humicola insolens
35	735	34.9	349	17	AAW04927	Cellulytic enzyme
36	729.5	34.6	306	19	AAW44269	Hybrid DNA protein
37	727.5	34.5	304	19	AAW44272	Hybrid DNA protein
38	725	34.4	307	19	AAW44273	Hybrid DNA protein
39	722.5	34.3	202	19	AAW53972	Macrophomina phase
40	722.5	34.3	222	17	AAW04929	Cellulytic enzyme
41	722.5	34.3	294	17	AAW04937	Chimeric endogluca
42	718	34.1	305	19	AAW44854	Humicola insolens
43	718	34.1	305	19	AAW41929	Humicola insolens
44	717	34.0	234	19	AAW46618	Humicola insolens
45	717	34.0	286	19	AAW57420	Humicola insolens

ALIGNMENTS

RESULT 1
AAB09825
ID AAB09825 standard; Protein; 387 AA.
XX
AC AAB09825;
XX
DT 25-SEP-2000 (first entry)
XX
DE Endoglucanase protein sequence 5.
XX
KW Endoglucanase; cellulose breakdown; produce pulp; papermaking;
KW animal foodstuff.
XX
OS Phycomyces nitens.
XX
PN WO200024879-A1.
XX
PD 04-MAY-2000.
XX
PF 25-OCT-1999; 99WO-JP05884.
XX
PR 23-OCT-1998; 98JP-0302387.
XX
PA (MEIJ) MEIJI SEIKA KAISHA LTD.
XX
PI Nakamura Y, Moriya T, Baba Y, Yanai K, Sumida N, Nishimura T;
PI Murashima K, Nakane A, Yaguchi T, Koga J, Murakami T, Kono T;
XX
DR WPI; 2000-365117/31.
DR N-PSDB; AAA62730.
XX
PT Endoglucanases of fungal origin with high activity under alkaline
PT conditions for production of paper pulp and animal feedstuffs -

XX
PS Claim 44; Page 125-127; 180pp; Japanese.
XX
CC This sequence represents an endoglucanase protein. The invention relates
CC to an endoglucanase of fungal origin which can completely break down
CC purified cellulose at a concentration of less than 1mg protein/litre,
CC and produces more than 50% breakdown of cellulose at pH 8.5. The
CC invention includes endoglucanase protein sequences (see
CC AAB09825-B09830), endoglucanase nucleotide sequences (see
CC AAA62726-A62732) and primers (AAA62733-A62802) which are used in the
CC identification of the endoglucanase sequences, and in the construction of
CC vectors containing the polynucleotides. The endoglucanase enzymes are
CC used for the production of pulp for papermaking and for the production of
CC animal foodstuffs.
XX
SQ Sequence 387 AA;

Query Match 100.0%; Score 2106; DB 21; Length 387;
Best Local Similarity 100.0%; Pred. No. 6.9e-140;
Matches 387; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Qy          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60

Qy         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120

Qy        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180

Qy        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240

Qy        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300

Qy        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360

Qy        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||||||||||||||||||||||
Db        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
```

RESULT 2
AAO15056
ID AAO15056 standard; Protein; 387 AA.
XX
AC AAO15056;
XX
DT 22-AUG-2002 (first entry)
XX
DE Rhizopus arrhizus endoglucanase-related protein 5.
XX
KW Zygomycetes-originated endoglucanase; cellulose binding domain;
KW fibre processing; waste paper de-inking; paper pulp.
XX
OS Mucor circinelloides.
XX
PN WO200242474-A1.
XX
PD 30-MAY-2002.
XX
PF 21-NOV-2001; 2001WO-JP10188.
XX
PR 21-NOV-2000; 2000JP-0354296.
XX
PA (MEIJ) MEIJI SEIKA KAISHA LTD.
XX
PI Nakane A, Baba Y, Koga J, Kubota H;
XX
DR WPI; 2002-471729/50.
DR N-PSDB; AAL43248.
XX
PT Cellulose-binding domain-lacking Zygomycetes-originated endoglucanase,
PT with effect of endoglucanase activity enhanced in processing fibers,
PT deinking waste paper and improving freeness of paper pulp -
XX
PS Claim 5; Page 73-75; 109pp; Japanese.
XX
CC The invention comprises the amino acid and coding sequences of
CC zygomycetes-originated endoglucanase enzymes lacking the cellulose
CC binding domain. The zygomycetes-originated endoglucanase enzymes of the
CC invention have enhanced endoglucanase activity. The zygomycetes-
CC originated endoglucanase enzymes of the invention are useful for
CC processing fibres, de-inking waste paper and improving the freeness of
CC paper pulp - which is particularly applicable in detergent compositions.
CC The present amino acid sequence represents an endoglucanase-related
CC protein of the invention.
XX
SQ Sequence 387 AA;

Query Match 100.0%; Score 2106; DB 23; Length 387;
Best Local Similarity 100.0%; Pred. No. 6.9e-140;
Matches 387; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Qy          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60

Qy         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120

Qy        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180
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Db        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180

Qy        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240

Qy        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300

Qy        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360

Qy        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||||||||||||||||||||||
Db        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
```

RESULT 3
ABB08064
ID ABB08064 standard; protein; 387 AA.
XX
AC ABB08064;
XX
DT 27-AUG-2002 (first entry)
XX
DE M. circinelloides CP99001 MCEII protein.
XX
KW Cellulase; endoglucanase; surfactant; detergent; cellulose; paper;
KW pulp treatment; MCEII.
XX
OS Mucor circinelloides.
XX

```
FH   Key             Location/Qualifiers
FT   Peptide         1..22
FT                   /note= "signal peptide"
FT   Protein         23..387
FT                   /note= "mature protein"
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PN   WO200238754-A1.
XX
PD   16-MAY-2002.
XX
PF   12-NOV-2001; 2001WO-JP09858.
XX
PR   10-NOV-2000; 2000JP-0343921.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Koga J,  Nakane A,  Baba Y,  Kono T;
XX
DR   WPI; 2002-471555/50.
XX
PT   Cellulase preparations containing transconjugant-originated
PT   endoglucanase and non-ionic surfactants, useful in detergent
PT   compositions, in treating cellulose fibers and deinking waste paper and
PT   improving freeness of paper pulp  -
XX
PS   Claim 3; Page 29-31; 38pp; Japanese.
XX
CC   The invention relates to a cellulase preparation comprising a
CC   transconjugant-originated endoglucanase and a non-ionic surfactant. The
CC   endoglucanase is selected from RCEI, RCEII, RCEII, MCEI, MCEII or PCEI
CC   proteins. The preparations are useful in detergent compositions, in
CC   treating cellulose fibers and deinking waste paper and improving the
CC   freeness of paper pulp. The fibers treated by the preparations have
CC   reduced feathering and improved skin-feel and appearance with colour
CC   clarification, local change in colour and softening, and after deinking
CC   and paper pulp treatment, there is an improvement on freeness of the
CC   paper pulp. This treatment with the cellulase preparation can be operated
CC   at significantly lower cost. The present sequence represents the
CC   M. circinelloides CP99001 MCEII protein.
XX
SQ   Sequence   387 AA;

  Query Match             100.0%;  Score 2106;  DB 23;  Length 387;
  Best Local Similarity   100.0%;  Pred. No. 6.9e-140;
  Matches  387;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

Qy          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60
              |||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60

Qy         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120

Qy        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180
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Db        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180

Qy        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240

Qy        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300

Qy        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360

Qy        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||||||||||||||||||||||
Db        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
```

```
RESULT 4
AAB09824
ID   AAB09824 standard; Protein; 338 AA.
XX
AC   AAB09824;
XX
DT   25-SEP-2000  (first entry)
XX
DE   Endoglucanase protein sequence 4.
XX
KW   Endoglucanase; cellulose breakdown; produce pulp; papermaking;
KW   animal foodstuff.
XX
OS   Mucor circinelloides.
XX
PN   WO200024879-A1.
XX
PD   04-MAY-2000.
XX
PF   25-OCT-1999;   99WO-JP05884.
XX
PR   23-OCT-1998;   98JP-0302387.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Nakamura Y,  Moriya T,  Baba Y,  Yanai K,  Sumida N,  Nishimura T;
PI   Murashima K,  Nakane A,  Yaguchi T,  Koga J,  Murakami T,  Kono T;
XX
DR   WPI; 2000-365117/31.
DR   N-PSDB; AAA62729.
XX
PT   Endoglucanases of fungal origin with high activity under alkaline
PT   conditions for production of paper pulp and animal feedstuffs  -
XX
PS   Claim 44; Page 120-122; 180pp; Japanese.
XX
CC   This sequence represents an endoglucanase protein. The invention relates
CC   to an endoglucanase of fungal origin which can completely break down
CC   purified cellulose at a concentration of less than 1mg protein/litre,
CC   and produces more than 50% breakdown of cellulose at pH 8.5. The
CC   invention includes endoglucanase protein sequences (see
CC   AAB09825-B09830), endoglucanase nucleotide sequences (see
CC   AAA62726-A62732) and primers (AAA62733-A62802) which are used in the
CC   identification of the endoglucanase sequences, and in the construction of
CC   vectors containing the polynucleotides. The endoglucanase enzymes are
CC   used for the production of pulp for papermaking and for the production of
CC   animal foodstuffs.
XX
SQ   Sequence   338 AA;

  Query Match             85.1%;  Score 1791.5;  DB 21;  Length 338;
  Best Local Similarity   87.3%;  Pred. No. 6.8e-118;
  Matches  338;  Conservative    0;  Mismatches    0;  Indels   49;  Gaps    1;

Qy          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60
              |||||||||||||||||||||||||||||
Db          1 MKFTVAITSIAVALALSSSAEAASCSSVYG----------------------------- 30

Qy         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120
                                 ||||||||||||||||||||||||||||||||||||||||
Db         31 ------------------QCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 71

Qy        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         72 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 131

Qy        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240
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Db        132 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 191

Qy        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300
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Qy        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360
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Db        252 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 311

Qy        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||||||||||||||||||||||
Db        312 NSDNPTMTFKEVTCPAELTTRSGCERK 338


RESULT 5
AAO15055
ID   AAO15055 standard; Protein; 338 AA.
XX
AC   AAO15055;
XX
DT   22-AUG-2002  (first entry)
XX
DE   Rhizopus arrhizus endoglucanase-related protein 4.
XX
KW   Zygomycetes-originated endoglucanase; cellulose binding domain;
KW   fibre processing; waste paper de-inking; paper pulp.
XX
OS   Mucor circinelloides.
XX
PN   WO200242474-A1.
XX
PD   30-MAY-2002.
XX
PF   21-NOV-2001; 2001WO-JP10188.
XX
PR   21-NOV-2000; 2000JP-0354296.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Nakane A,  Baba Y,  Koga J,  Kubota H;
XX
DR   WPI; 2002-471729/50.
DR   N-PSDB; AAL43247.
XX
PT   Cellulose-binding domain-lacking Zygomycetes-originated endoglucanase,
PT   with effect of endoglucanase activity enhanced in processing fibers,
PT   deinking waste paper and improving freeness of paper pulp  -
XX
PS   Claim 5; Page 68-70; 109pp; Japanese.
XX
CC   The invention comprises the amino acid and coding sequences of
CC   zygomycetes-originated endoglucanase enzymes lacking the cellulose
CC   binding domain. The zygomycetes-originated endoglucanase enzymes of the
CC   invention have enhanced endoglucanase activity. The zygomycetes-
CC   originated endoglucanase enzymes of the invention are useful for
CC   processing fibres, de-inking waste paper and improving the freeness of
CC   paper pulp - which is particularly applicable in detergent compositions.
CC   The present amino acid sequence represents an endoglucanase-related
CC   protein of the invention.
XX
SQ   Sequence   338 AA;

  Query Match             85.1%;  Score 1791.5;  DB 23;  Length 338;
  Best Local Similarity   87.3%;  Pred. No. 6.8e-118;
  Matches  338;  Conservative    0;  Mismatches    0;  Indels   49;  Gaps    1;

Qy          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60
              ||||||||||||||||||||||||||||||
Db          1 MKFTVAITSIAVALALSSSAEAASCSSVYG------------------------------ 30

Qy         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120
                                 |||||||||||||||||||||||||||||||||||||||||
Db         31 -------------------QCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 71

Qy        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         72 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 131

Qy        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        132 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 191

Qy        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        192 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 251

Qy        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        252 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 311

Qy        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||||||||||||||||||||||
Db        312 NSDNPTMTFKEVTCPAELTTRSGCERK 338


RESULT 6
ABB08063
ID   ABB08063 standard; protein; 338 AA.
XX
AC   ABB08063;
XX
DT   27-AUG-2002  (first entry)
XX
DE   M. circinelloides CP99001 MCEI protein.
XX
KW   Cellulase; endoglucanase; surfactant; detergent; cellulose; paper;
KW   pulp treatment; MCEI.
XX
OS   Mucor circinelloides.
XX
FH   Key             Location/Qualifiers
FT   Peptide         1..22
FT                   /note= "signal peptide"
FT   Protein         23..338
FT                   /note= "mature protein"
XX
PN   WO200238754-A1.
XX
PD   16-MAY-2002.
XX
PF   12-NOV-2001; 2001WO-JP09858.
XX
PR   10-NOV-2000; 2000JP-0343921.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Koga J,  Nakane A,  Baba Y,  Kono T;
XX
DR   WPI; 2002-471555/50.
XX
PT   Cellulase preparations containing transconjugant-originated
PT   endoglucanase and non-ionic surfactants, useful in detergent
PT   compositions, in treating cellulose fibers and deinking waste paper and
PT   improving freeness of paper pulp  -
XX
PS   Claim 3; Page 27-29; 38pp; Japanese.
XX
CC   The invention relates to a cellulase preparation comprising a
CC   transconjugant-originated endoglucanase and a non-ionic surfactant. The
CC   endoglucanase is selected from RCEI, RCEII, RCEII, MCEI, MCEII or PCEI
CC   proteins. The preparations are useful in detergent compositions, in
CC   treating cellulose fibers and deinking waste paper and improving the
CC   freeness of paper pulp. The fibers treated by the preparations have
CC   reduced feathering and improved skin-feel and appearance with colour
CC   clarification, local change in colour and softening, and after deinking
CC   and paper pulp treatment, there is an improvement on freeness of the
CC   paper pulp. This treatment with the cellulase preparation can be operated
CC   at significantly lower cost. The present sequence represents the
```

```
CC   M. circinelloides CP99001 MCEI protein.
XX
SQ   Sequence   338 AA;

  Query Match             85.1%;  Score 1791.5;  DB 23;  Length 338;
  Best Local Similarity   87.3%;  Pred. No. 6.8e-118;
  Matches  338;  Conservative    0;  Mismatches    0;  Indels   49;  Gaps    1;

Qy          1 MKFTVAITSIAVALALSSSAEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYSQ 60
              ||||||||||||||||||||||||||||||
Db          1 MKFTVAITSIAVALALSSSAEAASCSSVYG---------------------------- 30

Qy         61 CIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 120
                                 ||||||||||||||||||||||||||||||||||||||
Db         31 ------------------QCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNAG 71

Qy        121 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 180
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db         72 NASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVISG 131

Qy        181 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 240
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        132 GKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFMCNN 191

Qy        241 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 300
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        192 NQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDLGSN 251

Qy        301 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 360
              ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db        252 HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKWRFNWFK 311

Qy        361 NSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||||||||||||||||||||||
Db        312 NSDNPTMTFKEVTCPAELTTRSGCERK 338


RESULT 7
AAB09822
ID   AAB09822 standard; Protein; 366 AA.
XX
AC   AAB09822;
XX
DT   25-SEP-2000  (first entry)
XX
DE   Endoglucanase protein sequence 2.
XX
KW   Endoglucanase; cellulose breakdown; produce pulp; papermaking;
KW   animal foodstuff.
XX
OS   Rhizopus oryzae.
XX
PN   WO200024879-A1.
XX
PD   04-MAY-2000.
XX
PF   25-OCT-1999;   99WO-JP05884.
XX
PR   23-OCT-1998;   98JP-0302387.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Nakamura Y,  Moriya T,  Baba Y,  Yanai K,  Sumida N,  Nishimura T;
PI   Murashima K,  Nakane A,  Yaguchi T,  Koga J,  Murakami T,  Kono T;
XX
DR   WPI; 2000-365117/31.
DR   N-PSDB; AAA62727.
XX
PT   Endoglucanases of fungal origin with high activity under alkaline
PT   conditions for production of paper pulp and animal feedstuffs  -
XX
PS   Claim 44; Page 110-113; 180pp; Japanese.
XX
CC   This sequence represents an endoglucanase protein. The invention relates
CC   to an endoglucanase of fungal origin which can completely break down
CC   purified cellulose at a concentration of less than 1mg protein/litre,
CC   and produces more than 50% breakdown of cellulose at pH 8.5. The
CC   invention includes endoglucanase protein sequences (see
CC   AAB09825-B09830), endoglucanase nucleotide sequences (see
CC   AAA62726-A62732) and primers (AAA62733-A62802) which are used in the
CC   identification of the endoglucanase sequences, and in the construction of
CC   vectors containing the polynucleotides. The endoglucanase enzymes are
CC   used for the production of pulp for papermaking and for the production of
CC   animal foodstuffs.
XX
SQ   Sequence   366 AA;

  Query Match             64.7%;  Score 1363.5;  DB 21;  Length 366;
  Best Local Similarity   62.6%;  Pred. No. 7.9e-88;
  Matches  246;  Conservative   49;  Mismatches   65;  Indels   33;  Gaps    9;

Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||| :  | || || :||||||  | ||||||::|||||   |  |||
Db          1 MKFITITSSALLALALGTEMASAAKCSKLYGQCGGKDWNGPTCCESGSTCKVSND--YYS 58

Qy         60 QCIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCL-PGSHSNN 118
              ||:      : || || :| ||||  |:||||||||||| :  | |||||| | |
Db         59 QCLAPESNGNKSSECSKLYGQCGGKDWNGPTCCESGSTC--KVSNDYYSQCLAPES---- 112

Qy        119 AGNASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVI 178
                | : | ::: ||:|||| |      | :|           ||| || |::||  | ::
Db        113 --NGNKTSESAHKTTTTTAPA------KEIT-----------TTAKASNSSNSSGKYSIV 153

Qy        179 SGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLL-DANAQSGCNGGNGFM 237
              ||| ||:| ||||||||||||||||||:|: || :|  :|:: | |:| |||||||| :|
Db        154 SGGASGNGVTTRYWDCCKASCSWPGKANVSSPVKSCNKDGVTALSDSNVQSGCNGGNSYM 213

Qy        238 CNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDL 297
              ||:|||||||| ||||||||:|:|  |: ||| |:|||||| : :|||||:|||||||||
Db        214 CNDNQPWAVNDNLAYGFAAAAISGGGESRWCCSCFELTFTSTSVAGKKMVIQVTNTGGDL 273

Qy        298 GSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKW 354
              ||:   |||||||||||||||: |||||||||:||||:|| |||:|||||||||||||||
Db        274 GSSTGAHFDLQMPGGGVGIFNGCSKQWGAPNDGWGSRYGGISSASDCSSLPSALQAGCKW 333

Qy        355 RFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||:|||:||:|||||| |:| ::|| ||
Db        334 RFNWFKNADNPSMTYKEVTCPKEITAKTGCSRK 366


RESULT 8
AAO15053
ID   AAO15053 standard; Protein; 366 AA.
XX
AC   AAO15053;
XX
DT   22-AUG-2002  (first entry)
XX
DE   Rhizopus arrhizus endoglucanase-related protein 2.
XX
KW   Zygomycetes-originated endoglucanase; cellulose binding domain;
KW   fibre processing; waste paper de-inking; paper pulp.
XX
OS   Rhizopus arrhizus.
XX
PN   WO200242474-A1.
XX
PD   30-MAY-2002.
XX
PF   21-NOV-2001; 2001WO-JP10188.
XX
PR   21-NOV-2000; 2000JP-0354296.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Nakane A,  Baba Y,  Koga J,  Kubota H;
```

XX
DR WPI; 2002-471729/50.
DR N-PSDB; AAL43245.
XX
PT Cellulose-binding domain-lacking Zygomycetes-originated endoglucanase,
PT with effect of endoglucanase activity enhanced in processing fibers,
PT deinking waste paper and improving freeness of paper pulp -
XX
PS Claim 5; Page 58-60; 109pp; Japanese.
XX
CC The invention comprises the amino acid and coding sequences of
CC zygomycetes-originated endoglucanase enzymes lacking the cellulose
CC binding domain. The zygomycetes-originated endoglucanase enzymes of the
CC invention have enhanced endoglucanase activity. The zygomycetes-
CC originated endoglucanase enzymes of the invention are useful for
CC processing fibres, de-inking waste paper and improving the freeness of
CC paper pulp - which is particularly applicable in detergent compositions.
CC The present amino acid sequence represents an endoglucanase-related
CC protein of the invention.
XX
SQ Sequence 366 AA;

Query Match 64.7%; Score 1363.5; DB 23; Length 366;
Best Local Similarity 62.6%; Pred. No. 7.9e-88;
Matches 246; Conservative 49; Mismatches 65; Indels 33; Gaps 9;

```
Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||| :  | || || :||||||  | ||||||::|||||   |  |||
Db          1 MKFITITSSALLALALGTEMASAAKCSKLYGQCGGKDWNGPTCCESGSTCKVSND--YYS 58

Qy         60 QCIPKPKGSSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCL-PGSHSNN 118
              ||:      : || || :| ||||  |:||||||||||||  :  | ||||||  | |
Db         59 QCLAPESNGNKSSECSKLYGQCGGKDWNGPTCCESGSTC--KVSNDYYSQCLAPES---- 112

Qy        119 AGNASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVI 178
                | : | ::: ||:|||| |      | :|          ||| || |::||  | ::
Db        113 --NGNKTSESAHKTTTTTAPA------KEIT----------TTAKASNSSNSSGKYSIV 153

Qy        179 SGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLL-DANAQSGCNGGNGFM 237
              ||| ||:| ||||||||||||||||||:|: || :|  :|:: | |:| |||||||| :|
Db        154 SGGASGNGVTTRYWDCCKASCSWPGKANVSSPVKSCNKDGVTALSDSNVQSGCNGGNSYM 213

Qy        238 CNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDL 297
              ||:|||||||| |||||||||:|:|  |: ||| |:|||||| : :|||||:|||||||||
Db        214 CNDNQPWAVNDNLAYGFAAAAISGGGESRWCCSCPELTFTSTSVAGKKMVIQVTNTGGDL 273

Qy        298 GSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKW 354
              ||:   |||||||||||||||||: |||||||||:||||:|| |||:|||||||||||||
Db        274 GSSTGAHFDLQMPGGGVGIFNGCSKQWGAPNDGWGSRYGGISSASDCSSLPSALQAGCKW 333

Qy        355 RFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||:|||:||:|||||| |:| ::|| ||
Db        334 RFNWFKNADNPSMTYKEVTCPKEITAKTGCSRK 366
```

RESULT 9
ABB08061
ID ABB08061 standard; protein; 366 AA.
XX
AC ABB08061;
XX
DT 27-AUG-2002 (first entry)
XX
DE R. oryzae CP96001 RCEII protein.
XX
KW Cellulase; endoglucanase; surfactant; detergent; cellulose; paper;
KW pulp treatment; RCEII.
XX
OS Rhizopus oryzae.
XX
FH Key Location/Qualifiers
FT Peptide 1..23
FT /note= "signal peptide"
FT Protein 24..366
FT /note= "mature protein"
XX
PN WO200238754-A1.
XX
PD 16-MAY-2002.
XX
PF 12-NOV-2001; 2001WO-JP09858.
XX
PR 10-NOV-2000; 2000JP-0343921.
XX
PA (MEIJ) MEIJI SEIKA KAISHA LTD.
XX
PI Koga J, Nakane A, Baba Y, Kono T;
XX
DR WPI; 2002-471555/50.
XX
PT Cellulase preparations containing transconjugant-originated
PT endoglucanase and non-ionic surfactants, useful in detergent
PT compositions, in treating cellulose fibers and deinking waste paper and
PT improving freeness of paper pulp -
XX
PS Claim 3; Page 23-24; 38pp; Japanese.
XX
CC The invention relates to a cellulase preparation comprising a
CC transconjugant-originated endoglucanase and a non-ionic surfactant. The
CC endoglucanase is selected from RCEI, RCEII, RCEII, MCEI, MCEII or PCEI
CC proteins. The preparations are useful in detergent compositions, in
CC treating cellulose fibers and deinking waste paper and improving the
CC freeness of paper pulp. The fibers treated by the preparations have
CC reduced feathering and improved skin-feel and appearance with colour
CC clarification, local change in colour and softening, and after deinking
CC and paper pulp treatment, there is an improvement on freeness of the
CC paper pulp. This treatment with the cellulase preparation can be operated
CC at significantly lower cost. The present sequence represents the
CC R. oryzae CP96001 RCEII protein.
XX
SQ Sequence 366 AA;

Query Match 64.7%; Score 1363.5; DB 23; Length 366;
Best Local Similarity 62.6%; Pred. No. 7.9e-88;
Matches 246; Conservative 49; Mismatches 65; Indels 33; Gaps 9;

```
Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||| :  | || || :||||||  | ||||||::|||||   |  |||
Db          1 MKFITITSSALLALALGTEMASAAKCSKLYGQCGGKDWNGPTCCESGSTCKVSND--YYS 58

Qy         60 QCIPKPKGSSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCL-PGSHSNN 118
              ||:      : || || :| ||||  |:||||||||||||  :  | ||||||  | |
Db         59 QCLAPESNGNKSSECSKLYGQCGGKDWNGPTCCESGSTC--KVSNDYYSQCLAPES---- 112

Qy        119 AGNASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKVI 178
                | : | ::: ||:|||| |      | :|          ||| || |::||  | ::
Db        113 --NGNKTSESAHKTTTTTAPA------KEIT----------TTAKASNSSNSSGKYSIV 153

Qy        179 SGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLL-DANAQSGCNGGNGFM 237
              ||| ||:| ||||||||||||||||||:|: || :|  :|:: | |:| |||||||| :|
Db        154 SGGASGNGVTTRYWDCCKASCSWPGKANVSSPVKSCNKDGVTALSDSNVQSGCNGGNSYM 213

Qy        238 CNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDL 297
              ||:|||||||| |||||||||:|:|  |: ||| |:|||||| : :|||||:|||||||||
Db        214 CNDNQPWAVNDNLAYGFAAAAISGGGESRWCCSCPELTFTSTSVAGKKMVIQVTNTGGDL 273

Qy        298 GSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKW 354
              ||:   |||||||||||||||||: |||||||||:||||:|| |||:|||||||||||||
Db        274 GSSTGAHFDLQMPGGGVGIFNGCSKQWGAPNDGWGSRYGGISSASDCSSLPSALQAGCKW 333

Qy        355 RFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              |||||||:|||:||:|||||| |:| ::|| ||
Db        334 RFNWFKNADNPSMTYKEVTCPKEITAKTGCSRK 366
```

RESULT 10

```
AAB09821
ID   AAB09821 standard; Protein; 338 AA.
XX
AC   AAB09821;
XX
DT   25-SEP-2000  (first entry)
XX
DE   Endoglucanase protein sequence 1.
XX
KW   Endoglucanase; cellulose breakdown; produce pulp; papermaking;
KW   animal foodstuff.
XX
OS   Rhizopus oryzae.
XX
PN   WO200024879-A1.
XX
PD   04-MAY-2000.
XX
PF   25-OCT-1999;   99WO-JP05884.
XX
PR   23-OCT-1998;   98JP-0302387.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Nakamura Y,  Moriya T,  Baba Y,  Yanai K,  Sumida N,  Nishimura T;
PI   Murashima K,  Nakane A,  Yaguchi T,  Koga J,  Murakami T,  Kono T;
XX
DR   WPI; 2000-365117/31.
DR   N-PSDB; AAA62726.
XX
PT   Endoglucanases of fungal origin with high activity under alkaline
PT   conditions for production of paper pulp and animal feedstuffs  -
XX
PS   Claim 44; Page 106-108; 180pp; Japanese.
XX
CC   This sequence represents an endoglucanase protein. The invention relates
CC   to an endoglucanase of fungal origin which can completely break down
CC   purified cellulose at a concentration of less than 1mg protein/litre,
CC   and produces more than 50% breakdown of cellulose at pH 8.5. The
CC   invention includes endoglucanase protein sequences (see
CC   AAB09825-B09830), endoglucanase nucleotide sequences (see
CC   AAA62726-A62732) and primers (AAA62733-A62802) which are used in the
CC   identification of the endoglucanase sequences, and in the construction of
CC   vectors containing the polynucleotides. The endoglucanase enzymes are
CC   used for the production of pulp for papermaking and for the production of
CC   animal foodstuffs.
XX
SQ   Sequence   338 AA;

  Query Match             58.0%;  Score 1222.5;  DB 21;  Length 338;
  Best Local Similarity   57.1%;  Pred. No. 5.6e-78;
  Matches  226;  Conservative   40;  Mismatches   63;  Indels   67;  Gaps    6;

Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||| :  | || || :||||||  | |||||::|||||   |
Db          1 MKFITIASSALLALALGTEMASAAECSKLYGQCGGKNWNGPTCCESGSTCKVSND----- 55

Qy         60 QCIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNA 119
                                                       |||||||   | |
Db         56 ----------------------------------------------YYSQCLPSGSSGNK 69

Qy        120 GNASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAAST----STSSSAGY 175
               : |: |||:|     |     ||    ||||    ||:| | |||    |:|||  |
Db         70 SSESAHKKTTTAAHKKT-------TTAAHKKTTTAPAKKTTTVAKASTPSNSSSSSSGKY 122

Qy        176 KVISGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLL-DANAQSGCNGGN 234
               :||| ||:| ||||||||||||||||||:|: || :|  :|:: | |:||||||||||
Db        123 SAVSGGASGNGVTTRYWDCCKASCSWPGKANVSSPVKSCNKDGVTALSDSNAQSGCNGGN 182

Qy        235 GFMCNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTG 294
               :|||:|||||||| ||||||||:|:|  |: ||| |:|||||| : :||||||||||||
Db        183 SYMCNDNQPWAVNDNLAYGFAAAAISGGGESRWCCSCFELTFTSTSVAGKKMVVQVTNTG 242

Qy        295 GDLGSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAG 351
               |||||:   |||||||||||||||||::||||||||||:||||:|| |||:|||||||||
Db        243 GDLGSSTGAHFDLQMPGGGVGIFNGCSSQWGAPNDGWGSRYGGISSASDCSSLPSALQAG 302

Qy        352 CKWRFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              ||||||||||:|||:||:|||||  |:|  ::|| ||
Db        303 CKWRFNWFKNADNPSMTYKEVTCPKEITAKTGCSRK 338


RESULT 11
AAO15052
ID   AAO15052 standard; Protein; 338 AA.
XX
AC   AAO15052;
XX
DT   22-AUG-2002  (first entry)
XX
DE   Rhizopus arrhizus endoglucanase-related protein 1.
XX
KW   Zygomycetes-originated endoglucanase; cellulose binding domain;
KW   fibre processing; waste paper de-inking; paper pulp.
XX
OS   Rhizopus arrhizus.
XX
PN   WO200242474-A1.
XX
PD   30-MAY-2002.
XX
PF   21-NOV-2001; 2001WO-JP10188.
XX
PR   21-NOV-2000; 2000JP-0354296.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Nakane A,  Baba Y,  Koga J,  Kubota H;
XX
DR   WPI; 2002-471729/50.
DR   N-PSDB; AAL43244, AAL43250.
XX
PT   Cellulose-binding domain-lacking Zygomycetes-originated endoglucanase,
PT   with effect of endoglucanase activity enhanced in processing fibers,
PT   deinking waste paper and improving freeness of paper pulp  -
XX
PS   Claim 5; Page 54-55; 109pp; Japanese.
XX
CC   The invention comprises the amino acid and coding sequences of
CC   zygomycetes-originated endoglucanase enzymes lacking the cellulose
CC   binding domain. The zygomycetes-originated endoglucanase enzymes of the
CC   invention have enhanced endoglucanase activity. The zygomycetes-
CC   originated endoglucanase enzymes of the invention are useful for
CC   processing fibres, de-inking waste paper and improving the freeness of
CC   paper pulp - which is particularly applicable in detergent compositions.
CC   The present amino acid sequence represents an endoglucanase-related
CC   protein of the invention.
XX
SQ   Sequence   338 AA;

  Query Match             58.0%;  Score 1222.5;  DB 23;  Length 338;
  Best Local Similarity   57.1%;  Pred. No. 5.6e-78;
  Matches  226;  Conservative   40;  Mismatches   63;  Indels   67;  Gaps    6;

Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||| :  | || || :||||||  | |||||::|||||   |
Db          1 MKFITIASSALLALALGTEMASAAECSKLYGQCGGKNWNGPTCCESGSTCKVSND----- 55

Qy         60 QCIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNA 119
                                                       |||||||   | |
Db         56 ----------------------------------------------YYSQCLPSGSSGNK 69

Qy        120 GNASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAAST----STSSSAGY 175
               : |: |||:|     |     ||    ||||    ||:| | |||    |:|||  |
Db         70 SSESAHKKTTTAAHKKT-------TTAAHKKTTTAPAKKTTTVAKASTPSNSSSSSSGKY 122
```

```
Qy        176 KVISGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLL-DANAQSGCNGGN 234
              :||| ||:| ||||||||||||||||||:|: || :|  :|:: | |:||||||||||
Db        123 SAVSGGASGNGVTTRYWDCCKASCSWPGKANVSSPVKSCNKDGVTALSDSNAQSGCNGGN 182

Qy        235 GFMCNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTG 294
              :|||:|||||||| |||||||:|:|  |: ||| |:|||||| : :||||||||||||
Db        183 SYMCNDNQPWAVNDNLAYGFAAAAISGGGESRWCCSCFELTFTSTSVAGKKMVVQVTNTG 242

Qy        295 GDLGSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAG 351
              |||||:   |||||||||||||||||::||||||||||:||||:|| |||:|||||||||
Db        243 GDLGSSTGAHFDLQMPGGGVGIFNGCSSQWGAPNDGWGSRYGGISSASDCSSLPSALQAG 302

Qy        352 CKWRFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              ||||||||||:|||:||:|||||| |:| ::|| ||
Db        303 CKWRFNWFKNADNPSMTYKEVTCPKEITAKTGCSRK 338
```

RESULT 12
ABB08060
ID ABB08060 standard; protein; 338 AA.
XX
AC ABB08060;
XX
DT 27-AUG-2002 (first entry)
XX
DE R. oryzae CP96001 RCEI protein.
XX
KW Cellulase; endoglucanase; surfactant; detergent; cellulose; paper;
KW pulp treatment; RCEI.
XX
OS Rhizopus oryzae.
XX
FH Key Location/Qualifiers
FT Peptide 1..23
FT /note= "signal peptide"
FT Protein 24..338
FT /note= "mature protein"
XX
PN WO200238754-A1.
XX
PD 16-MAY-2002.
XX
PF 12-NOV-2001; 2001WO-JP09858.
XX
PR 10-NOV-2000; 2000JP-0343921.
XX
PA (MEIJ) MEIJI SEIKA KAISHA LTD.
XX
PI Koga J, Nakane A, Baba Y, Kono T;
XX
DR WPI; 2002-471555/50.
XX
PT Cellulase preparations containing transconjugant-originated
PT endoglucanase and non-ionic surfactants, useful in detergent
PT compositions, in treating cellulose fibers and deinking waste paper and
PT improving freeness of paper pulp -
XX
PS Claim 3; Page 21-22; 38pp; Japanese.
XX
CC The invention relates to a cellulase preparation comprising a
CC transconjugant-originated endoglucanase and a non-ionic surfactant. The
CC endoglucanase is selected from RCEI, RCEII, RCEII, MCEI, MCEII or PCEI
CC proteins. The preparations are useful in detergent compositions, in
CC treating cellulose fibers and deinking waste paper and improving the
CC freeness of paper pulp. The fibers treated by the preparations have
CC reduced feathering and improved skin-feel and appearance with colour
CC clarification, local change in colour and softening, and after deinking
CC and paper pulp treatment, there is an improvement on freeness of the
CC paper pulp. This treatment with the cellulase preparation can be operated
CC at significantly lower cost. The present sequence represents the
CC R. oryzae CP96001 RCEI protein.
XX
SQ Sequence 338 AA;

Query Match 58.0%; Score 1222.5; DB 23; Length 338;
Best Local Similarity 57.1%; Pred. No. 5.6e-78;
Matches 226; Conservative 40; Mismatches 63; Indels 67; Gaps 6;

```
Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||| :  | || || :||||||  | |||||::|||||   |
Db          1 MKFITIASSALLALALGTEMASAAECSKLYGQCGGKNWNGPTCCESGSTCKVSND-----55

Qy         60 QCIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNA 119
                                                          |||||||   | |
Db         56 ----------------------------------------------YYSQCLPSGSSGNK 69

Qy        120 GNASSTKKTSTKTSTTTAKATATVTTKTVTKTTTKTTTKTSTTAAAST----STSSSAGY 175
               : |: |||:|     |       ||    ||||    ||:| | |||    |:|||  |
Db         70 SSESAHKKTTTAAHKKT-------TTAAHKKTTTAPAKKTTTVAKASTPSNSSSSSSGKY 122

Qy        176 KVISGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLL-DANAQSGCNGGN 234
              :||| ||:| ||||||||||||||||||:|: || :|  :|:: | |:||||||||||
Db        123 SAVSGGASGNGVTTRYWDCCKASCSWPGKANVSSPVKSCNKDGVTALSDSNAQSGCNGGN 182

Qy        235 GFMCNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTG 294
              :|||:|||||||| |||||||:|:|  |: ||| |:|||||| : :||||||||||||
Db        183 SYMCNDNQPWAVNDNLAYGFAAAAISGGGESRWCCSCFELTFTSTSVAGKKMVVQVTNTG 242

Qy        295 GDLGSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAG 351
              |||||:   |||||||||||||||||::||||||||||:||||:|| |||:|||||||||
Db        243 GDLGSSTGAHFDLQMPGGGVGIFNGCSSQWGAPNDGWGSRYGGISSASDCSSLPSALQAG 302

Qy        352 CKWRFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              ||||||||||:|||:||:|||||| |:| ::|| ||
Db        303 CKWRFNWFKNADNPSMTYKEVTCPKEITAKTGCSRK 338
```

RESULT 13
AAB09823
ID AAB09823 standard; Protein; 360 AA.
XX
AC AAB09823;
XX
DT 25-SEP-2000 (first entry)
XX
DE Endoglucanase protein sequence 3.
XX
KW Endoglucanase; cellulose breakdown; produce pulp; papermaking;
KW animal foodstuff.
XX
OS Rhizopus oryzae.
XX
PN WO200024879-A1.
XX
PD 04-MAY-2000.
XX
PF 25-OCT-1999; 99WO-JP05884.
XX
PR 23-OCT-1998; 98JP-0302387.
XX
PA (MEIJ) MEIJI SEIKA KAISHA LTD.
XX
PI Nakamura Y, Moriya T, Baba Y, Yanai K, Sumida N, Nishimura T;
PI Murashima K, Nakane A, Yaguchi T, Koga J, Murakami T, Kono T;
XX
DR WPI; 2000-365117/31.
DR N-PSDB; AAA62728.
XX
PT Endoglucanases of fungal origin with high activity under alkaline
PT conditions for production of paper pulp and animal feedstuffs -
XX
PS Claim 44; Page 115-117; 180pp; Japanese.
XX
CC This sequence represents an endoglucanase protein. The invention relates
CC to an endoglucanase of fungal origin which can completely break down
CC purified cellulose at a concentration of less than 1mg protein/litre,

```
CC   and produces more than 50% breakdown of cellulose at pH 8.5. The
CC   invention includes endoglucanase protein sequences (see
CC   AAB09825-B09830), endoglucanase nucleotide sequences (see
CC   AAA62726-A62732) and primers (AAA62733-A62802) which are used in the
CC   identification of the endoglucanase sequences, and in the construction of
CC   vectors containing the polynucleotides. The endoglucanase enzymes are
CC   used for the production of pulp for papermaking and for the production of
CC   animal foodstuffs.
XX
SQ   Sequence   360 AA;

  Query Match             56.8%;  Score 1195.5;  DB 21;  Length 360;
  Best Local Similarity   56.2%;  Pred. No. 4.7e-76;
  Matches  221;  Conservative   47;  Mismatches   86;  Indels   39;  Gaps    6;

Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||: :  | || ||  | ||||  | ||||||::||||    || :||
Db          1 MKFLTIASSAILALAVGTEMAHAAECSKAYYQCGGKNWDGPTCCESGSTCVDYPDNPFYS 60

Qy         60 QCIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNA 119
              ||:|    :|:: |                |  ||       :|:|
Db         61 QCVPNENLTSTNKSSHKT------------TTTESAKKTTTTKGSK-------------- 94

Qy        120 GNASSTKKTSTKTS--TTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKV 177
                | |:|: |  ||| :|:   ||   :| || |||| ::|: :|:|:|:|  |
Db         95 ------KTTTTEASKKTTTTEASKKTTTTEASKKTT-TTTKKASTSTSSSSSSASTNYSA 147

Qy        178 ISGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFM 237
              :||| ||:| |||||||| |||||||| || || :|  :| :| | | |:|| ||: :
Db        148 VSGGASGNGETTRYWDCCKPSCSWPGKADVTSPVGSCNKDGKTLADNNTQNGCVGGSSYT 207

Qy        238 CNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDL 297
              ||:|||| |:|:|||||||||:| :|| ||| |:|||||  |  ||||||||||| ||
Db        208 CNDNQPWVVSDDLAYGFAAASISGGSEATWCCACFELTFTSTAVKGKKMVVQVTNTGSDL 267

Qy        298 GSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKW 354
              |||   |||||||||||||:|||| ||||| |||||||||||| |||::||||||||||
Db        268 GSNTGAHFDLQMPGGGVGIYNGCATQWGAPTDGWGARYGGVSSASDCSNLPSALQAGCKW 327

Qy        355 RFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              || ||||:||||||:|:||||  :| :||| ||
Db        328 RFGWFKNADNPTMTYKQVTCPKAITAKSGCSRK 360


RESULT 14
AAO15054
ID   AAO15054 standard; Protein; 360 AA.
XX
AC   AAO15054;
XX
DT   22-AUG-2002  (first entry)
XX
DE   Rhizopus arrhizus endoglucanase-related protein 3.
XX
KW   Zygomycetes-originated endoglucanase; cellulose binding domain;
KW   fibre processing; waste paper de-inking; paper pulp.
XX
OS   Rhizopus arrhizus.
XX
PN   WO200242474-A1.
XX
PD   30-MAY-2002.
XX
PF   21-NOV-2001; 2001WO-JP10188.
XX
PR   21-NOV-2000; 2000JP-0354296.
XX
PA   (MEIJ ) MEIJI SEIKA KAISHA LTD.
XX
PI   Nakane A,  Baba Y,  Koga J,  Kubota H;
XX
DR   WPI; 2002-471729/50.
DR   N-PSDB; AAL43246.
XX
PT   Cellulose-binding domain-lacking Zygomycetes-originated endoglucanase,
PT   with effect of endoglucanase activity enhanced in processing fibers,
PT   deinking waste paper and improving freeness of paper pulp  -
XX
PS   Claim 5; Page 63-65; 109pp; Japanese.
XX
CC   The invention comprises the amino acid and coding sequences of
CC   zygomycetes-originated endoglucanase enzymes lacking the cellulose
CC   binding domain. The zygomycetes-originated endoglucanase enzymes of the
CC   invention have enhanced endoglucanase activity. The zygomycetes-
CC   originated endoglucanase enzymes of the invention are useful for
CC   processing fibres, de-inking waste paper and improving the freeness of
CC   paper pulp - which is particularly applicable in detergent compositions.
CC   The present amino acid sequence represents an endoglucanase-related
CC   protein of the invention.
XX
SQ   Sequence   360 AA;

  Query Match             56.8%;  Score 1195.5;  DB 23;  Length 360;
  Best Local Similarity   56.2%;  Pred. No. 4.7e-76;
  Matches  221;  Conservative   47;  Mismatches   86;  Indels   39;  Gaps    6;

Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||: :  | || ||  | ||||  | ||||||::||||    || :||
Db          1 MKFLTIASSAILALAVGTEMAHAAECSKAYYQCGGKNWDGPTCCESGSTCVDYPDNPFYS 60

Qy         60 QCIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNA 119
              ||:|    :|:: |                |  ||       :|:|
Db         61 QCVPNENLTSTNKSSHKT------------TTTESAKKTTTTKGSK-------------- 94

Qy        120 GNASSTKKTSTKTS--TTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKV 177
                | |:|: |  ||| :|:   ||   :| || |||| ::|: :|:|:|:|  |
Db         95 ------KTTTTEASKKTTTTEASKKTTTTEASKKTT-TTTKKASTSTSSSSSSASTNYSA 147

Qy        178 ISGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFM 237
              :||| ||:| |||||||| |||||||| || || :|  :| :| | | |:|| ||: :
Db        148 VSGGASGNGETTRYWDCCKPSCSWPGKADVTSPVGSCNKDGKTLADNNTQNGCVGGSSYT 207

Qy        238 CNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDL 297
              ||:|||| |:|:|||||||||:| :|| ||| |:|||||  |  ||||||||||| ||
Db        208 CNDNQPWVVSDDLAYGFAAASISGGSEATWCCACFELTFTSTAVKGKKMVVQVTNTGSDL 267

Qy        298 GSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKW 354
              |||   |||||||||||||:|||| ||||| |||||||||||| |||::||||||||||
Db        268 GSNTGAHFDLQMPGGGVGIYNGCATQWGAPTDGWGARYGGVSSASDCSNLPSALQAGCKW 327

Qy        355 RFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              || ||||:||||||:|:||||  :| :||| ||
Db        328 RFGWFKNADNPTMTYKQVTCPKAITAKSGCSRK 360


RESULT 15
ABB08062
ID   ABB08062 standard; protein; 360 AA.
XX
AC   ABB08062;
XX
DT   27-AUG-2002  (first entry)
XX
DE   R. oryzae CP96001 RCEIII protein.
XX
KW   Cellulase; endoglucanase; surfactant; detergent; cellulose; paper;
KW   pulp treatment; RCEIII.
XX
OS   Rhizopus oryzae.
XX
FH   Key             Location/Qualifiers
FT   Peptide         1..23
FT                   /note= "signal peptide"
FT   Protein         24..360
FT                   /note= "mature protein"
XX
```

PN WO200238754-A1.
XX
PD 16-MAY-2002.
XX
PF 12-NOV-2001; 2001WO-JP09858.
XX
PR 10-NOV-2000; 2000JP-0343921.
XX
PA (MEIJ) MEIJI SEIKA KAISHA LTD.
XX
PI Koga J, Nakane A, Baba Y, Kono T;
XX
DR WPI; 2002-471555/50.
XX
PT Cellulase preparations containing transconjugant-originated
PT endoglucanase and non-ionic surfactants, useful in detergent
PT compositions, in treating cellulose fibers and deinking waste paper and
PT improving freeness of paper pulp -
XX
PS Claim 3; Page 25-27; 38pp; Japanese.
XX
CC The invention relates to a cellulase preparation comprising a
CC transconjugant-originated endoglucanase and a non-ionic surfactant. The
CC endoglucanase is selected from RCEI, RCEII, RCEII, MCEI, MCEII or PCEI
CC proteins. The preparations are useful in detergent compositions, in
CC treating cellulose fibers and deinking waste paper and improving the
CC freeness of paper pulp. The fibers treated by the preparations have
CC reduced feathering and improved skin-feel and appearance with colour
CC clarification, local change in colour and softening, and after deinking
CC and paper pulp treatment, there is an improvement on freeness of the
CC paper pulp. This treatment with the cellulase preparation can be operated
CC at significantly lower cost. The present sequence represents the
CC R. oryzae CP96001 RCEIII protein.
XX
SQ Sequence 360 AA;

Query Match 56.8%; Score 1195.5; DB 23; Length 360;
Best Local Similarity 56.2%; Pred. No. 4.7e-76;
Matches 221; Conservative 47; Mismatches 86; Indels 39; Gaps 6;

```
Qy          1 MKFTVAITSIAVALALSSS-AEAASCSSVYGQCGGIGWTGPTCCDAGSTCKAQKDNKYYS 59
              |||    :|  :|||: :  | || ||  | ||||  | |||||::||||    || :||
Db          1 MKFLTIASSAILALAVGTEMAHAAECSKAYYQCGGKNWDGPTCCESGSTCVDYPDNPFYS 60

Qy         60 QCIPKPKGSSSSSSCSSVYSQCGGIGWSGPTCCESGSTCVAQEGNKYYSQCLPGSHSNNA 119
              ||:|    :|:: |                 |  ||       :|:|
Db         61 QCVPNENLTSTNKSSHKT-----------TTTESAKKTTTTKGSK-------------- 94

Qy        120 GNASSTKKTSTKTS--TTTAKATATVTTKTVTKTTTKTTTKTSTTAAASTSTSSSAGYKV 177
                    | |:|: |  ||| :|:   ||   :| || |||| ::|: :|:|:|:|  |
Db         95 ------KTTTTEASKKTTTTEASKKTTTTEASKKTT-TTTKKASTSTSSSSSSASTNYSA 147

Qy        178 ISGGKSGSGSTTRYWDCCKASCSWPGKASVTGPVDTCASNGISLLDANAQSGCNGGNGFM 237
              :||| ||:| |||||||||| |||||||| || || :|  :| :| | | |:|| ||: :
Db        148 VSGGASGNGETTRYWDCCKPSCSWPGKADVTSPVGSCNKDGKTLADNNTQNGCVGGSSYT 207

Qy        238 CNNNQPWAVNDELAYGFAAASIAGSNEAGWCCGCYELTFTSGAASGKKMVVQVTNTGGDL 297
              ||:|||| |:|:|||||||||:| :|| ||| |:|||||| |  ||||||||||| ||
Db        208 CNDNQPWVVSDDLAYGFAAASISGGSEATWCCACFELTFTSTAVKGKKMVVQVTNTGSDL 267

Qy        298 GSN---HFDLQMPGGGVGIFNGCAAQWGAPNDGWGARYGGVSSVSDCASLPSALQAGCKW 354
              |||   ||||||||||||:|||| ||||| |||||||||||| |||::|||||||||||
Db        268 GSNTGAHFDLQMPGGGVGIYNGCATQWGAPTDGWGARYGGVSSASDCSNLPSALQAGCKW 327

Qy        355 RFNWFKNSDNPTMTFKEVTCPAELTTRSGCERK 387
              || ||||:|||||||:|:|||| :| :||| ||
Db        328 RFGWFKNADNPTMTYKQVTCPKAITAKSGCSRK 360
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Search completed: June 18, 2003, 15:30:59
Job time : 43.4159 secs